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Incentive as a Factor in Problem-Solving Among Idiots[1]

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The behavior of an individual in response to a stimulus-situation is influenced, not only by the immediate situation, but also by the inherited mechanism and the experience of the individual. What we learn, and how we learn it, depend upon these three factors, and to say, as Kuo implies, that learning is entirely dependent on the immediate situation seems as unreasonable as would be the statement that this factor has no influence whatever. However, since we cannot control or change the inheritance factor, and since the experience of each individual necessarily varies, the stimulus seems to be the most promising means of control in studies of learning. The effect of intensity reinforcement and interference of stimuli, therefore, merits attention. The data presented in this paper to illustrate the effect of the stimulus were collected incidentally in a study of problem solving among idiots.[2] They are meant merely to be suggestive of the possibilities in a similar but more intensive study to be pursued later.

In problem-solving experiments, with animals as subjects, fruit has been used as a lure. This was at first considered impracticable with idiot subjects; because of their experience with

1. This is a report of one of a series of experimental studies in the adaptive behavior of idiots, conducted at The Training School at Vineland under a financial grant from Mrs. Leonard Elmhirst. The author is indebted to Dr. Edgar A. Doll for the general direction of the study and for material assistance in preparing this report.

2. Idiocy is the gravest degree of mental deficiency. It includes those feeble-minded persons whose general mental ability at maturity will not exceed approximately 3 years. The condition is due to gross absence of mental development as a result of numerous causes.

prepared rather than with whole fruit it was expected that unprepared fruit would have but little lure value. Cookies and candies did not seem sufficiently large and colorful to attract the attention of subjects who manifested indifference to the situation. Various types of toys were tried in an effort to find something of a strong general appeal. After a few periods of familiarizing the child with the object a large, brightly, colored ball seemed most effective in attracting all the children of the experimental group. When a child failed to solve a given problem the experimenter placed a cookie on the ball, after making sure that the child recognized this additional stimulus as food. If the ball and cookie combined failed to bring about the desired response in ten minutes, the trial was considered a failure. On the two succeeding days the ball and cookie were again presented. After successive failures in three such trials the ball was replaced by a banana.

The subjects of this study were eight boys of The Training School, whose mental ages ranged from 19 to 38 months, and whose life ages were between 8.6 and 11.9 years. These data are presented in Table I.

TABLE 1.

DESCRIPTION OF SUBJECTS

No.	Name	Life Age (Years)	Kuhlmann-Binet Mental Age (Months)	I. Q.
1	Harry	10.4	19	15
2	Gus	10.0	20	20
3	Davey	11.9	20	14
4	Sammy	8.6	32	31
5	Buster	10.3	33	25
6	Carl	8.6	36	35
7	Nick	10.1	38	32
8	Jimmy	10.8	38	30

The major investigation included three experimental problems. Each of these involved the use of a box or boxes to obtain a lure which was suspended from the ceiling of the experimental room. The height of the lure was adjusted according to the height of the child and varied with the number of boxes to be used.

The solution of Problem I required that the subject stand upon a single box, which he had moved on his own initiative to a favorable position under the ball. In Problem II it was necessary to place one box upon another and to stand upon the structure thus built. Problem III called for the use of a three-box structure. The room was devoid of distraction except for the lure and the boxes to be used in the solution. The child was taken into the room and left alone, without instructions, and apparently unaware of the fact that he was being subjected to the constant observation of the experimenter through a one-way vision screen in the door.

Results. Four of the eight subjects, Davey, Sammy, Buster and Carl, were sufficiently attracted by the ball to solve Problem I, which required the use of one box, without reinforcing the stimulus. Other reactions were as follows:

Jimmy looked at the ball and seemed to center his activities about it to a certain extent. The box, which was in this problem a new object, also attracted much attention *per se*. This of course, interfered with the solution and indicated that the ball was an insufficient lure. The experimenter entered the room, showed Jimmy the cookie she held, and, without comment, placed it on the ball and left the room. The effect was immediate. Jimmy pushed the box to position under the ball, stood on it, and secured both the cookie and the ball. He repeated this solution, on two succeeding days, in less than one minute.

Nick started toward the ball but, when he heard the door close, came back and began to cry and whine, "I'm scared." His crying continued, with increasing volume, until the experimenter entered the room. Nick was shown the cookie and watched its placement on the ball. The experimenter left immediately and Nick, without hesitation, pushed the box into place beneath the lure and secured both the cookie and the ball. Like Jimmy, he completed the trials, on the succeeding days, in less than one minute.

Harry was a hyperactive child, but his movements were almost entirely random. The addition of a cookie apparently made little or no difference; he was excessively but ineffectively active with or without the added stimulation.

Gus did little more than look at the ball and tap on the box. His eyes were fastened on the ball regardless of his po-

sition in the room. However, after one or two futile attempts to obtain the ball by reaching, he seemed perfectly content merely to look at it. The addition of a cookie to the lure was accompanied by a very apparent increase in his activities, and he reached repeatedly. When the experimenter re-entered the room he led her to the ball and pointed to it and then to himself. In this case it is difficult to say whether or not the lure as used was the strongest possible. Since a slight increase in the intensity of the stimulus resulted in increased activity, perhaps a greater increase would have overcome his dependence upon others and caused him to look about for a solution more applicable than the primitive reaching response. The problem in this case would be to discover a more effective means of reinforcing the lure. A banana was not tried with either Gus or Harry because, when offered to them in the cottage, they ignored it completely.

Problem II, which required the use of two boxes, was successfully solved by Carl and Sammy when the ball alone was used as a lure. Nick, Jimmy and Buster solved this problem only when the ball was reinforced by the addition of a cookie. Davey and Harry failed on this problem with both the ball, and the ball and cookie combined, as lures. A banana was not tried, because, like Gus and Harry in Problem I, Davey also ignored a banana when it was offered to him. These three children who failed either or both of Problems I and II have the lowest mental ages of the group, according to test.

Problem III showed some interesting individual differences in performance. Sammy solved this problem, with the ball as the lure, in 3, 2 and 5 minutes, respectively, for three trials. A banana was then substituted and the time of his solution decreased to 45 seconds.

Buster built a three-box structure for every trial of Problem III, but instead of standing on it he always lowered the top box to the floor, stood on the remaining two boxes and reached repeatedly toward the lure. When the banana was substituted for the ball and cookie his hesitancy disappeared and, with knees shaking, he stood on the three-box structure and obtained the fruit.

Jimmy and Carl solved Problem III satisfactorily when a cookie was added, although activity had been discontinued in that direction after several futile attempts with the ball alone as a lure.

Nick used only two boxes until the banana was substituted for the ball and cookie. After this change he solved Problem III on three trials in less than two minutes each.

Inasmuch as a two-box structure was a step in the solution of Problem III, those children who had failed on Problem II were considered incapable of solving the three-box problem. Davey, Gus and Harry were therefore not given this problem.

The above results indicate that, in determining the effect of the incentive on these problem situations, individual differences played a more important role than did mental age (as measured by the Khulmann-Binet scale.) There appears to be a minimum mental age for success, and beyond this other factors play an important part. It is true that the only failures on Problem I were made by the two most deficient subjects, Harry and Gus. However, Nick and Jimmy, whose scores were highest in the group, were the only two for whom it was necessary to reinforce the ball as an incentive. The four subjects falling between these two extremes solved the problem for the ball alone.

Problem II was solved by Carl and Sammy when the ball alone was used as a lure. Buster, Nick and Jimmy required the addition of a cookie to the lure before making an adequate solution. Harry, Gus and Davey failed, regardless of the incentive. In this problem again the most gravely deficient failed, irrespective of incentive, while others succeeded, not in relation to their mental ages, but in relation to their individual reactions to given stimuli.

Problem III further bore out the above inference. Sammy solved without additional incentive, Jimmy and Carl solved when a cookie was added, and Nick and Buster both failed until a banana was substituted for the ball and cookie. In this problem only Sammy, whose mental age is lowest of the five who succeeded on this problem, did not require any reinforcement of stimuli.

Conclusions. The experimental study of incentive in problem-solving situations is still in a very elementary stage. Perhaps none of our subjects has reached his greatest possible stimulation. These few results, however, appear to indicate that:

1. Increased intensity of the stimulus is accompanied by an increase in the number of successful solutions. This suggests the importance of finding a desirable incentive in establishing any new behavior pattern with these children.

2. Regardless of the intensity of the stimulus, however, there are certain physiological and intellectual limits beyond which the child does not succeed. This suggests that incentive is not sufficient in itself, but must be accompanied by simplification of the tasks to within the child's limitations.

3. The effect of the lure varies with individual subjects and a future experimental problem will be to determine any general tendencies which may exist in this respect. The present status of the study, however, suggests that each child must be studied independently in order to discover the value of incentive and the most effective means of increasing this value for him.

4. There is only a relatively slight relationship between mental age and the value of incentive. The behavior of all the subjects changed perceptibly with a reinforcement of the lure. Although the failures were among the three most gravely deficient, there seemed to be little or no correlation between the mental ages and the need of increased incentive among the five subjects whose mental ages were highest. There are, therefore, other factors than mental age involved in such a study, which may eventually throw light on interesting personality differences and their relation to trainability.

"Traditional education quickly discovers what the mental defective cannot do, but it is left to special education to discover what he can do."

Revelation

Heather Collier

Harmon had always been considered weak; he shared the opinion himself, as a matter of course. His little boyhood had been spent among lads who, although no older than he, seemed always to brush him aside. They ran past him, shouting to one another, tumbling through games, easily doing things that seemed impossible to Harmon.

At first he followed them about, and even took a minor part in their play. He had a little Indian suit, and a cardboard tomahawk, and he yelled as wildly and brandished his flimsy weapon as fiercely as any of them. But they soon outstripped him and the time came when they tired of playing Indian and began to devise games with rules that were, to Harmon, only a complicated maze of instructions, forgotten as soon as heard. When they played Cops n' Robbers he became confused and ran the wrong way, clumsily. In the other games it was the same, and soon he was limited to the role of spectator, sitting alone on the playground fence, never taking part in the activities of the boys.

From his seat on the fence he was able to watch all that transpired on both sides of it. He saw the traffic that passed in the street, and although the rumble of the motor vans and the flash and speed of the cars vaguely alarmed him, he came to love the horses. In the rush of traffic they trotted quietly along, passed by trucks, pleasure cars, and even bicycles, but seeming not to mind. Their job was to pull wagons, and pull them they did, slowly but steadily. Harmon, from his post, rejoiced to see them and to hear the patient "clop-clop-clop" of their iron-shod feet above the drone of their swifter competitors.

There came a day, though, when Harmon ceased to sit watching the boys at play on one side of the fence and the world roaring by on the other. He left the city and the playground and went to a new home.

He had grown until now he was very tall, but his tallness meant nothing to him; to himself he was still the little boy who sat aside and watched activities in which he was unable to take part. The new home was different from anything he had ever known. There was no fence about a playground, but open green fields where the boys frolicked and tumbled much as did the

boys he had known. There was a difference, however, for here he found others who, like himself, found joy in simpler activities. He was no longer alone; he knew the infinite comfort of companionship.

And then, a few days after his arrival, he saw Dandy! Dandy was a horse whose purpose in life was to pull a sturdy wagon about the grounds while busy hands filled it with interesting boxes and barrels, freshly mown grass or fragrant brown leaves. The Clean-Up Man sat in jovial state on the high throne that was the seat of the wagon. His court was the group of ruddy-cheeked boys who raked the leaves into piles and gathered them into baskets, and were in many ways very useful and very happy. And Dandy, with his sturdy legs and broad back, was a horse worthy of the adoration that Harmon immediately and obviously bestowed on him.

Because his interest was so evident, Harmon was given his chance to ride on the clean-up wagon, and to help with the work in various little ways. He enjoyed it immensely; he felt necessary and important. He straightened his broad shoulders and even stood a little taller, with a new dignity. He grew brown and ruddy in the fresh, sunny air, and his appetite increased until it was almost alarming. The hollows in his cheeks filled out, and he slept long and deeply, with a health that he did not yet appreciate. But not yet had he come fully into his own.

One day there was a heavier box to be moved. The Clean-Up Man was dragging it down to the roadside, seeming to find the task difficult. And Harmon suddenly knew that *he* would not find it so. His eyes shone in quick excitement as he slipped down from his perch on the wagon and pushed the Clean-Up Man aside. He slid his fingers under the corners of the box and tensed his big muscles. The box moved easily. Harmon laughed as he lifted it and slid it into the wangon. He laughed again, exultantly, and flexed his muscles as he climbed up to his seat beside the Clean-Up Man and the wagon moved off, to the "clop-clop-clop" of Dandy's big shoes.

The world, Harmon thought, was very sweet and very kind. He had found his place, he was tall and straight, and he knew that he was strong—*strong!*

Book Reviews

ARTHUR, GRACE. *A Point Scale of Performance Tests: Clinical Manual.* New York, The Commonwealth Fund Division of Publications, 1930. 82 pp.

This is strictly a clinical manual, the author having excluded from it "everything not of immediate use in the daily routine of the psychological examination." A second volume will deal more fully with the construction and standardization of the scale, for those who are more interested in this phase of the problem.

The order of publication, however, suggests that Dr. Arthur feels the urgent need of a more adequate performance scale. This is certainly justified. Up to the present time there has been no performance test which could be employed with any confidence as a check upon the Binet and at the same time an adequate supplement to the Binet in certain abnormal situations. Performance tests are notoriously affected by practice, and this scale is unique in that it presents two forms, with standardization for readministration.

The first chapter gives a brief history of the scale, with a few words on its correlation. For 285 children Dr. Arthur obtained a P.E. of measurement of 2.6 between the Performance Scale I.Q.'s and those of the Kuhlmann Binet. Terman's P.E. of estimate is 4.5 for readministration of the Stanford Binet. Then follows a series of about eight cases, in which the Performance Scale supplements the Binet advantageously in differentiating manual type dull normal from feeble-minded, penalizes foreign and deaf children, and may act as a "shock absorber," etc.

The next two chapters describe the 18 tests making up the two forms, the method of administering and scoring, their norms, and the means of obtaining the M.A. and I.Q. There is also a chapter on the method of extrapolation, i.e., extending the mental age for scores beyond either end of the norms. The final chapter deals with the procedure in case of an omitted test, and gives the method of obtaining a score for the complete scale.

It would seem that a more happy selection of tests might have been made in some cases; Healy Pictorial I is in rather general disrepute, the Witmer Formboard is a little more handy than the Seguin, and similar objections might be made to one or two others of the tests. Also the amount of time required raises a question as to how much some of the individual tests contribute to the general reliability and validity. These, with other questions, must probably await the publication of the second volume. Also, it is to be hoped that the author may be enabled to continue a more detailed study of the psychological functions tapped and their relation to achievement; in other words, comprehensive validation.

Both from the academic standpoint of standardization and from the pragmatic one of the pressing need of clinical psychology, Dr. Arthur and the Mental Hygiene Committee are to be congratulated upon this contribution.

Vineland, N. J. —GORDON L. RILEY

ADLER, ALFRED. *Problems of Neurosis.* New York, Cosmopolitan Book Corporation, 1930. 244 pp.

Adler bases his explanation of human behavior upon one underlying drive: the desire to achieve superiority. He also believes that the methods which the individual will employ to attain his end are generally well established in the child character or "prototype," which is built up in the first four or five years of life. Since the nature of the child's earliest environment, especially his social contacts, is the principal factor in determining what methods the "prototype" will employ in striving to reach the goal, it follows that this early life experience is of supreme importance in the preparation for the tasks of later life.

As may be expected from the foregoing, Adler lays very little stress upon hereditary dispositions. Mental subnormality and congenital idiocy are exceptions to this stand, but within the range of normal intelligence, he declares that "it is proper to assume that everyone can do everything necessary." Differences in inherited material he does not deny, but considers the use of the material of first importance.

This proposition of the "prototype" is not new. The Catholic fathers declared that, were they given a child for the first seven years of his life, it mattered little who trained him after that. Adler has shown what may be the psychological explanation for this long-recognized truth. In doing so he has perhaps been too dogmatic and fitted his causes and effects together too neatly to be in accord with common observation of the variability and complexity of causes and effects which go to make up human nature. Nevertheless, there is much to be gained from acquaintance with his keen observations, even when the total argument is accepted only in part.

Adler has served a good cause in discounting to some extent the effects of heredity. It has become so much the fashion to blame all varieties of human traits upon heredity that environmental influences are often not sufficiently considered. He is unquestionably voicing a sound view when he argues that the important thing is not so much what the material is to begin with, but how skillfully it is handled in its impressionable stages and molded for later use.

The case history method is used by the author in developing his thesis, but the cases are used merely as illustrative material for the principles presented. A brilliant prefatory essay by F. G. Crookshank adds much to the value of the book for the general reader. An excellent orientation in the history and point of view of the school of individual psychology is given in this essay, which provides the proper psychological setting for the work by Adler.

Vineland, N. J. —RUTH T. MELCHER

The Healthy Mind

"Let us define mental health as the adjustment of human beings to the world and to each other with a maximum of effectiveness and happiness. Not just efficiency, or just contentment—or the grace of obeying the rules of the game cheerfully. It is all of these together. It is the ability to maintain an even temper, an alert intelligence, socially considerate behavior, and a happy disposition. This, I think, is a healthy mind."—*The Human Mind,* by Karl A. Menninger.

A Gift to Research

The Department of Research of The Training School at Vineland wishes to express its appreciation for the generous gift of a complete set of Bell and Howell motion picture equipment. Everything necessary for satisfactory amateur motion pictures is included in this gift. The progress of research and physiotherapy with birth-injured subjects at The Training School has been most gratifying. We had reached a point however, where the motion picture technique seemed essential to further work, but our resources did not permit the necessary purchases. Mr. and Mrs. Walter McDougall, the former a member of the Board of Trustees of The Training School and Chairman of the Committee on Research and Provision, made a gift of $1,000 for this purpose as a memorial to one of our birth-injured children. This gift makes possible not only the initial equipment but also sufficient film for a year's work.

Muscle training of a few birth-injured children was begun at The Training School early in 1928. Research evaluation of the progress made under treatment was begun at the same time. At the end of a year's time it became evident that motion picture records would be of the utmost importance, not only as objective evidence and a permanent record of the progress made, but also as a means of studying the motor features of these children. Early in 1930 preliminary work was done to determine whether the purchase of motion picture apparatus would be justified. The results immediately showed the importance of a continuous photographic record of the work. However, the purchase of such equipment was not possible until the special gift by Mr. and Mrs. McDougall was made for this specific purpose.

Notes From the Institution Diary

November 28-29—Christmas store was more attractive than ever before. Every year there seems to be more gifts made by the children themselves. These beautiful rugs, baskets, pieces of needlework, and charming little favors are made by the children in school. And many are carried to a finish through the knowledge that they will be displayed at the Christmas Store and sent to their own homes or to the homes of other girls or boys.

During all these days work on the Christmas play is steadily going on. Every part is being made ready to fit into the great whole. Songs, recitations and drills are being practiced; all of which will eventually be a part of the great Christmas play. Scenery is being painted and beautiful costumes are being made. Every girl and boy knows that their part, however small, is necessary to make the Christmas spirit complete .

December 1—Christmas greens have already begun to appear, for hundreds of yards of roping are being made. Wreaths, roping and other decorations are developing under skillful hands.

Our Christmas trees will all be taken from our own nursery, where numbers of beautiful Christmas trees remind us all the year of the holidays ahead.

December 15—Work in the Christmas rooms began, and the piles of boxes are growing higher and higher every day. But all this means that there have been many busy shopping days both for the parents at home and our own workers here.

However busy, however full the days may have been, Christmas Eve finds everybody ready and in Garrison Hall at 7:30 p. m. waiting for the arrival of Santa Claus. And isn't it wonderful that during all the years he has never forgotten to come to The Training School or to go to Menantico Colony?

And then when Christmas day is over with all the marvel of gifts; toys, books, games, and sweaters, the big dinner; all of which will hardly have past when comes the Christmas play, which is really the great event of Christmas week, "The Wizard of Oz," will be presented on the evening of December 30th. This represents the work of one-hundred children, and is not only the presentation of a wonderful play full of Christmas spirit, but represents the highest type of training for a great number of children of all ages.

Christmas is Here

A real appreciation of the words "It is more blessed to give than to receive" came to me yesterday, as I stood in the clothing store room and watched the girls and boys at Christmas store. They were buying Christmas presents, not for themselves, but to send to the folks at home, and never was there such weighty-decision or care in selection. And over all the spirit of Christmas seemed to shine out from the faces of those cheerful, patient folk who waited upon the children.

Christmas in the years long past was the time to receive gifts, and eager hands and hearts awaited each Christmas morning. But one day something happened in the Santa Claus room that almost changed the whole conception of Christmas.

First of all, the Santa Claus room is a most mysterious room. For weeks before Christmas packages come. Parents bring them in their cars or by taxi and the postman brings a lot, but the little truck that goes to town every morning and stops, among other places, at the post office for the mail bags and the express offices for the express packages brings most of all. There is always a boy or two to go to town on the express truck, and all through the year they are the advance messengers, telling the various boys and girls, "a package came for you today." "What's in it?" "I dunno, but it's a good big one."

Along in December, however, the little express truck comes more and more loaded and the packages, instead of going to the store room to be opened and distributed as soon as possible are now sent over to the rooms set apart for Santa Claus. Everybody who goes to these rooms comes out with such a mysterious look, and yet such a happy look, that every youngster hopes for a little bit of inside information. And just because the folks remember their childhood days, a part of the truth leaks out and the first thing you know you are stopped on the walk and told that "Santa brang one of my presents already!"

In the Santa Claus room the packages are all checked and recorded. Anything not already marked with the owner's name is so marked. Seals and tissue paper are preserved or provided, so that everything's in ship shape order for Christmas morning.

But

There are some children who do not have families to provide them with presents from uncles and aunts and cousins, or even from mother and father and brothers and sisters. And some have not even grandfathers and grandmothers. Well, of course there are friends who remember the friendless and who send presents or money, and so we have in the Santa Claus room a lot of things to give to those who have no friends, and of course Christmas never finds any child in The Training School without Christmas gifts.

Now, once upon a time, several years ago, while the helpers of Santa were working in his room, a couple of weeks before Christmas, someone came in with a letter and said, "Just listen to this." Then she read a letter from the father of one of the little boys, that told of the trouble and sickness there had been in that family and the long weeks without work and the fact that there were seven other children. And it wound up with a pathetic paragraph in broken English, saying that he could not send anything for the little boy at The Training School, and that, as they had no money, none of the children at home would get anything for Christmas.

Then the exclamation broke out, "A whole family without Christmas! This must not be!" Surely, from our abundance, we could supply this one need, and so by dint of questioning Tommy and remembering conversations about the children, a box was made up and sent to Tommy's family and everyone had a Christmas.

Then was born a new idea for our children. Instead of receiving, getting, taking, always at Christmas, they might have the blessing of giving. Now, for weeks before Christmas they save their spending money. Often the folks from home send some extra, and then on the Friday and Saturday after Thanksgiving, is held Christmas store.

On the long counters in the Store room, on the walls and shelves and on lines strung from corner to corner are presents of every description. Some have been made in the school department; rugs, dolls, toys. Some have been purchased; books, games, trinkets, handkerchiefs, neckties, gloves. Here is a great array of things to be purchased at wholesale prices and sent home to the loved ones.

We have had much happiness throughout the years in seeing the children enjoy their Christmas gifts, but there is something about this selecting to give that quite transcends the receiving.

Buying is usually a slow process, with much explaining to the clerks why grandfather would like a brilliant red necktie or why the baby should have a soft cloth doll. Eyes brighten and voices rise a bit in pitch as this exciting but pleasant time goes on. The only sad part is when one's credit is all used up. Every once in awhile some boy or girl wants to give some less fortunate friend some of his or her affluence, a sort of pre-Christmas giving.

Somehow, Christmas Store brings no arguments nor disagreements. There is a frame of mind that carries on through the following weeks, even into and beyond Christmas itself. The children approach Christmas Eve feeling that they too have given, and that the folks at home will soon be opening packages from them.

When Santa himself appears on the stage at Garrison Hall with his jingling sleigh bells, his rosy face and his brilliant dress, and the children crowd up on the platform to greet him, there is always someone who says "I sent some presents home, too," and we see a new personality, that supreme blessed spirit that is able at last to give.

—J.

"Toys are the tools of play. As the adult cannot practice the highest type of work without right materials and tools, in like manner the child must be provided with play materials and tools if he is to secure productive play. Play to be productive must enlist the child's creative powers, which must develop from crudity of expression to higher levels of outward excellence. Much of the child's play life is valueless both in process and product because his play equipment is so limited both in quality and quantity."

—Patty Hill

Menantico Colony

Frank G. Merithew

Annual Report

Buildings

Outstanding in the work of the past quarter are the new barn buildings. The bull barn, a concrete block structure 60′ x 20′, is now completed. This barn will accommodate four bulls, leaving ample space for the storage of feed, hay and bedding. There is a six-foot alley in front of the pens, which are twelve feet square, and built with Star equipment. The doors leading to the exercise pens are so arranged that they can be opened and closed without entering the pens. There is to be a breeding crate for each pen, built on the plan suggested by the Experiment Station, which arrangement will enable us to use our sires without necessitating the use of a staff.

The cow barn is a building 40′ x 146′, of concrete structure, with concrete floors throughout. There are two silos, 14′ x 36′, each having a capacity of 121 tons of ensilage.

The feed room, adjoining the silo room, is a two-story structure, 24′ x 40′, with floors of reinforced concrete. The upper story is to be used for the storage of grain. There is ample room on this floor for the mixing of feed, which, when mixed, will be put into bins and delivered to the first floor through chutes. This plan of handling the feed should insure a minimum loss of grain.

The cow barn proper, which is 105 feet over all, is built to accommodate fifty head of cattle. The floors are all concrete, with cork brick used for the stalls. On one side of the barn the stalls have a depth of 56 inches, and on the other side of the barn a depth of 61 inches. The stanchions have a four-inch adjustment. Each cow has an individual drinking bowl. The arched ceiling was first covered with insulite board, then furrowed with shingle lath and then lathed and plastered, using metal lath. The object of the air space is to prevent condensation. The side walls have been tiled up to window height. There are forty Vento Puttyless Steel Barn windows, with protective wind shields, and the barn is equipped with Star power ventilation, consisting of four fans, two on each side, installed

in the pilaster, just below the eve line. The pilaster, which is of hollow construction, opens on the inside of the barn at the floor level. The fans operate automatically and are governed in pairs, by a rheostat. Fresh air intakes are located in the center of the barn, at the head of the cattle.

Since the demonstration, last summer and early fall, of spraying cattle at each milking period for the purpose of increasing milk flow and butter fat proved advantageous, four outlets have been installed on either side of the barn for the purpose of working the electric sprayer.

The water line, which was laid inside a four-inch pipe, enters at the center of the barn on the east side and extends through to the milk house. A pit was built in line with each stanchion row and covered by a flat piece of iron, laid flush with the floor line. This construction will enable us to remove the water line at any time without disturbing the cement floor.

The sewerage line is connected with the gutters and mangers. Provision has been made so that it can be connected with the new barn when built; also with a water tank which will be placed in the barnyard at some future date. The water fountain in the barnyard will be so constructed that water can be let out of the fountain at any time to flush the entire line. The sewerage line extends across the road from the barn and will be used for surface irrigation.

The milk house is a concrete block structure 20′ x 20′, connected with the barn by a covered concrete walk. At the entrance to the milk house is a small room with a raised platform, from which the milk is poured into a small tank. A pipe leads from the tank through the wall into the tank of the cooler. The milk house is to have a cement floor, tiled walls, plastered ceiling and steel windows, fitted with screens. The milk, as it passes from the cooler, is to be separated and put in cans for distribution. This same room will contain the washing tank and sterilizer. A four horse-power steam boiler will furnish steam for radiation, sterilization and heating of water.

Crops

The apple crop of the past season was the best we have ever had. The orchard yielded 1616 bushels of excellent apples. Forty acres of ensilage corn yielded 340 tons of ensilage. Three

acres of cucumbers produced 638 bushels, for which there was ready sale. The pepper crop also was very good, although the low price of peppers was unfortunate. From 5 acres of early potatoes we harvested 1972 baskets.

The sweet potato crop was exceptionally good compared with crops harvested by other growers. From 12 acres we produced 2809 hampers. This is an average of 234 hampers per acre, while the average crop elsewhere seems to have been from 150 to 175 hampers per acre.

We displayed sweet potatoes at the annual exhibit of the New Jersey State Horticultural Society, held at Atlantic City, December 4 and 5, receiving first prize in the amateur class. We were also awarded the sweepstakes in the amateur classes, which carried a prize of a silver trophy, presented by the Atlantic City Chamber of Commerce.

Sixteen tons of alfalfa hay were harvested. This was somewhat less than we had expected, the shortage being due to the lack of rainfall. The late potato crop also suffered from the drought.

Through the efforts of Mr. George Mitchell, who has always been deeply interested in the progress of the Colony, we are now in touch with the Fitz Water Wheel Company, who assure us, after looking over the situation, that there is sufficient normal flow of water from our dam to operate, if rightly handled, a water wheel which will give us power enough to lift water to the height of 12 feet. The lay of our land is such that we could thus irrigate 40 acres or more. Not only will a water wheel furnish sufficient power for this purpose, but it can be used to run an electric light plant which will produce from 10 to 12 kilowatts.

Mr. Mitchell has written, "The need for hay and pasture will be much greater when the dairy herd is at Menantico. Experience has proved that these crops are not dependable on our soil in dry weather, and for that reason one object of constructing the dam was to help make available the water supply of Menantico Creek. The dam gives a water power of seven feet head, and we have found that, taking into account measurements of the flow of the stream that have been taken during several years, sufficient power will be furnished to pump water to irrigate forty acres more or less of land having an elevation

of twelve feet or less, above the surface of the pond. This land can be furnished with water pumped through terra cotta pipe and flowing through ditches to flood grass land according to methods used successfully in the Western United States, and other parts of the world. To install a water power pumping plant for irrigation alone would be somewhat expensive. We have, therefore, investigated the possibility of using the water power the year round for the generation of electricity, and judging from the advice secured from reliable sources, it appears that the full use of the water power is justified. The present hookup with a public source of supply of electricity, partial or complete, should be retained for emergency. The entire water power may be required for irrigation at times in very dry seasons."

" 'With the screwed down desk has gone the screwed up teacher.' This means, Miss Irwin points out, deepened satisfaction for teacher and pupil together. It means, too, that home and community agencies are becoming as much a part of the actual school picture as are the crayons and blocks and little red chairs of the 'new' education. Parents and social workers are joined by this new sort of teacher in meeting the problems of Billy's adenoids, Dora's insufficient breakfasts, Tom's petty thieving, Peggy's truancy. The richer, freer school life the new teacher represents is a growing force in preventing youthful ills of the flesh and of the spirit, and the new teacher is a team mate to be counted on in straightening out the difficulties of home situations which are behind most of the difficulties of the girls and boys themselves." —SURVEY